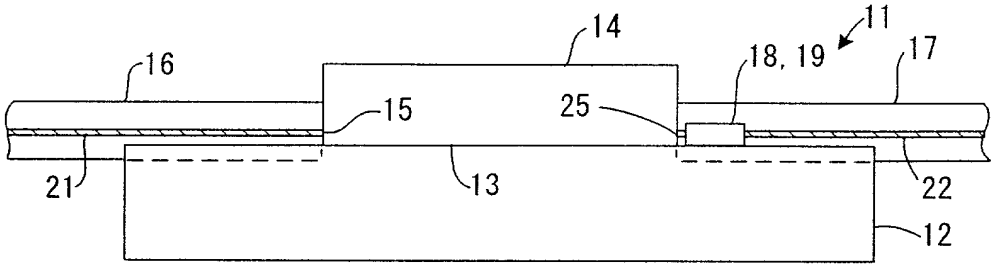
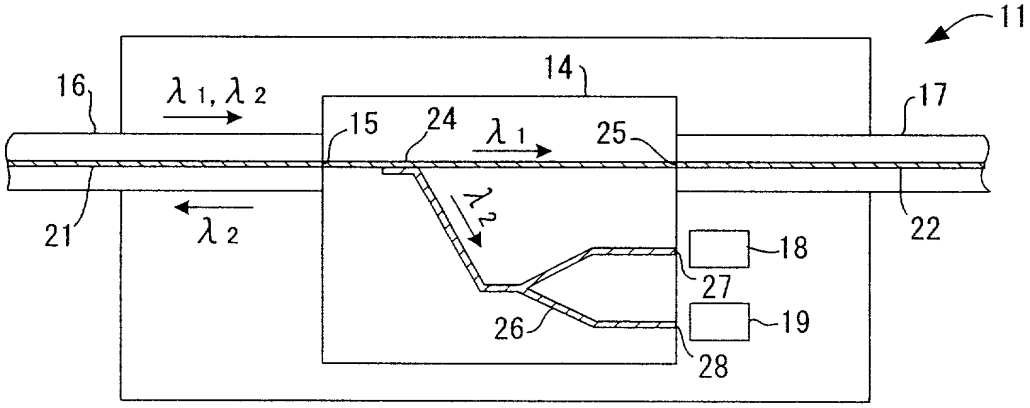
FIG. 1 PRIOR ART



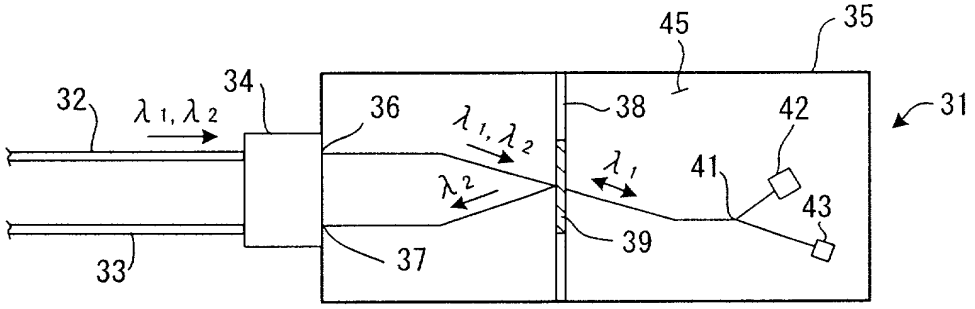
11: WAVELENGTH MULTIPLEXING OPTICAL COMMUNICATION MODULE
12: SILICON SUBSTRATE
13: UPPER SURFACE
14: OPTICAL WAVEGUIDE
15: OPTICAL CIRCUIT PORT
16: I/O PORT OPTICAL FIBER
17: OPTICAL FIBER
18: PHOTODIODE (PD) MODULE
19: LASER DIODE MODULE
21, 22: CORE
25: OPTICAL OUTPUT PORT

FIG. 2 PRIOR ART



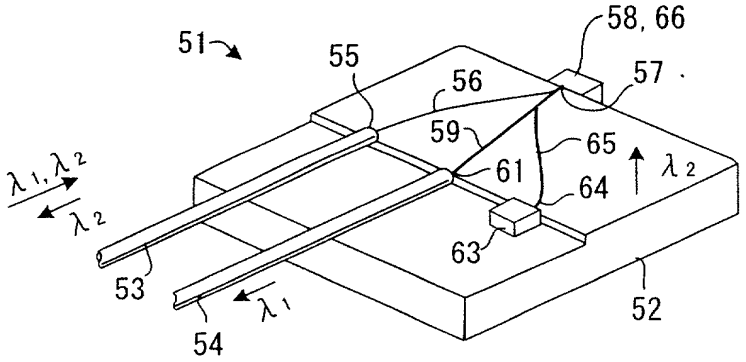
λ1, λ2: WAVELENGTH
11: WAVELENGTH MULTIPLEXING OPTICAL COMMUNICATION MODULE
12: SILICON SUBSTRATE
14: OPTICAL WAVEGUIDE
15: OPTICAL CIRCUIT PORT
16: I/O PORT OPTICAL FIBER
17: OPTICAL FIBER
18: PHOTODETECTOR
19: LASER DIODE (LD) MODULE
21, 22: CORE
24: MULTIPLEXING/DEMULTIPLEXING SECTION IN OPTICAL CIRCUIT
25: OPTICAL OUTPUT PORT
26: BRANCHING SECTION
27, 28: PORT

FIG. 3 PRIOR ART



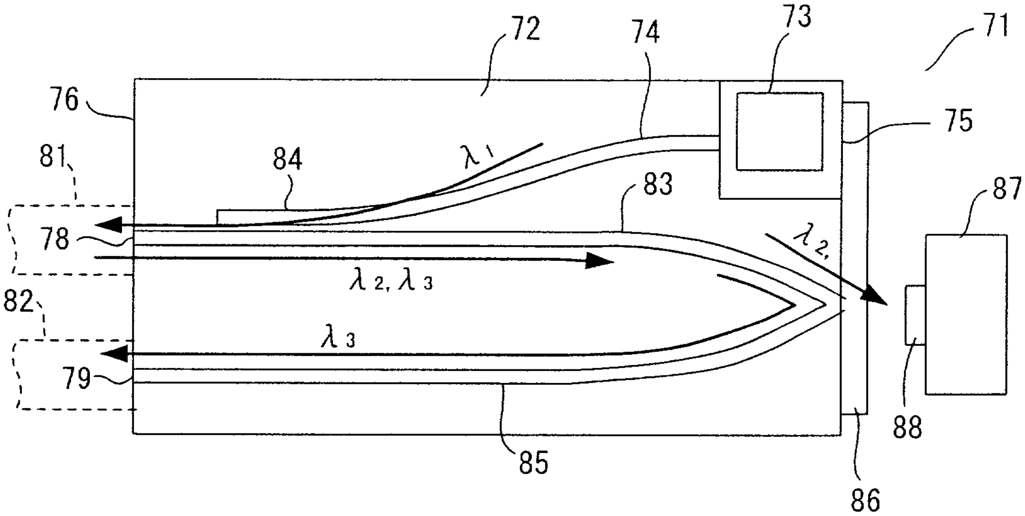
λ1, λ2: WAVELENGTH
31: WAVELENGTH MULTIPLEXING OPTICAL COMMUNICATION MODULE
32: SINGLE MODE OPTICAL FIBER FOR INPUT
33: OPTICAL FIBER FOR OUTPUT
34: GLASS BLOCK
35: OPTICAL WAVEGUIDE
36, 37: I/O PORT
38 : GROOVE
39 : DIELECTRIC MULTI-LAYER FILM
41: BRANCHING SECTION
42: LASER DIODE MODULE
43: PHOTO DIODE MODULE
45: REFERENCE PLANE OF PLANAR OPTICAL WAVEGUIDE CIRCUIT

FIG. 4 PRIOR ART



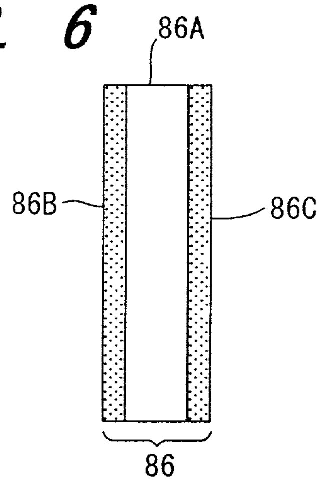
λ1, λ2: WAVELENGTH
51: WAVELENGTH MULTIPLEXING OPTICAL COMMUNICATION MODULE
52: OPTICAL WAVEGUIDE SUBSTRATE
53: 1ST OPTICAL FIBER
54: 2ND OPTICAL FIBER
55: 1ST PORT
56: 1ST OPTICAL WAVEGUIDE
57: 2ND PORT
58: WAVELENGTH DEMULTIPLEXING ELEMENT
59: 2ND OPTICAL WAVEGUIDE
61: 3RD PORT
63: LASER DIODE MODULE
64: 4TH PORT
65: 3RD OPTICAL WAVEGUIDE
66: PHOTODETECTOR FOR OPTICAL OUTPUT MONITOR

FIG. 5



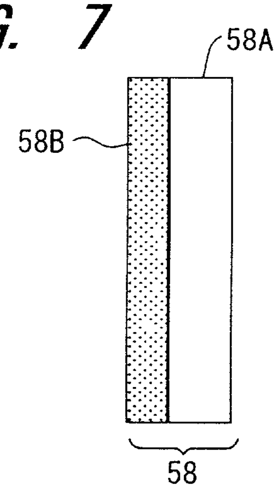
λ1, λ2, λ3:WAVELENGTH
71 :WAVELENGTH MULTIPLEXING OPTICAL COMMUNICATION MODULE
72: OPTICAL WAVEGUIDE SUBSTRATE
73: LIGHT EMITTING DEVICE
74: 1ST OPTICAL WAVEGUIDE
75, 76: END FACE
78:1ST PORT
79: 2ND PORT
81: 1ST OPTICAL FIBER
82: 2ND OPTICAL FIBER
83: 2ND OPTICAL WAVEGUIDE
84: DIRECTIONAL COUPLER
85: 3RD OPTICAL WAVEGUIDE
86: WAVELENGTH FILTER
87: CARRIER
88: PHOTODETECTOR FOR RECEPTION

FIG. 6



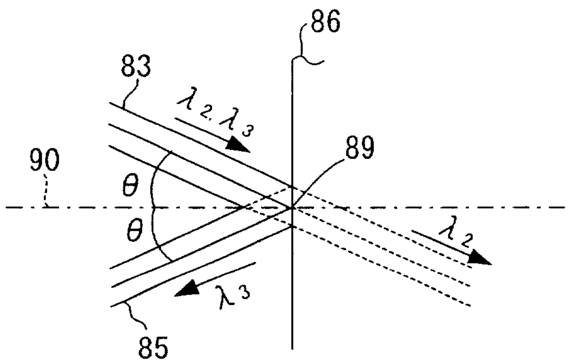
86: WAVELENGTH FILTER
86A: GLASS SUBSTRATE
86B, B6C: DIELECTRIC MULTI·LAYER FILM

FIG. 7



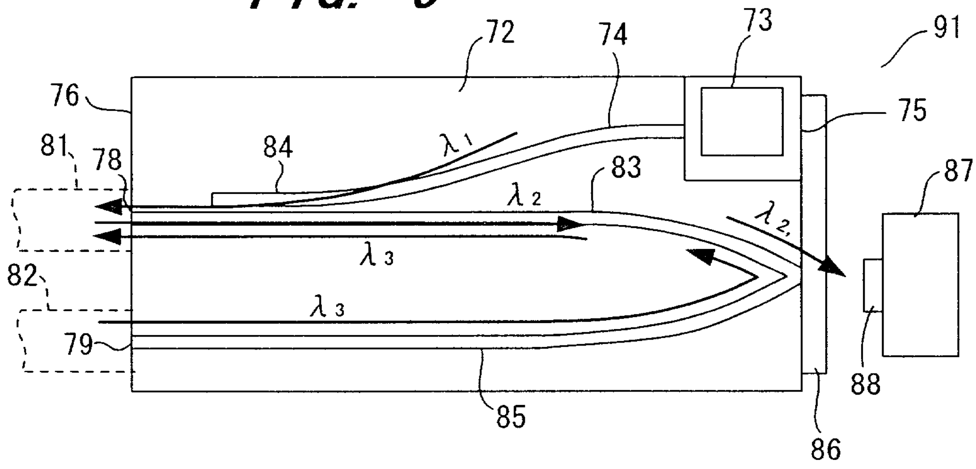
58: WAVELENGTH DEMULTIPLEXING ELEMENT
58A: HALF MIRROR
58B: DIELECTRIC MULTI·LAYER FILM

FIG. 8



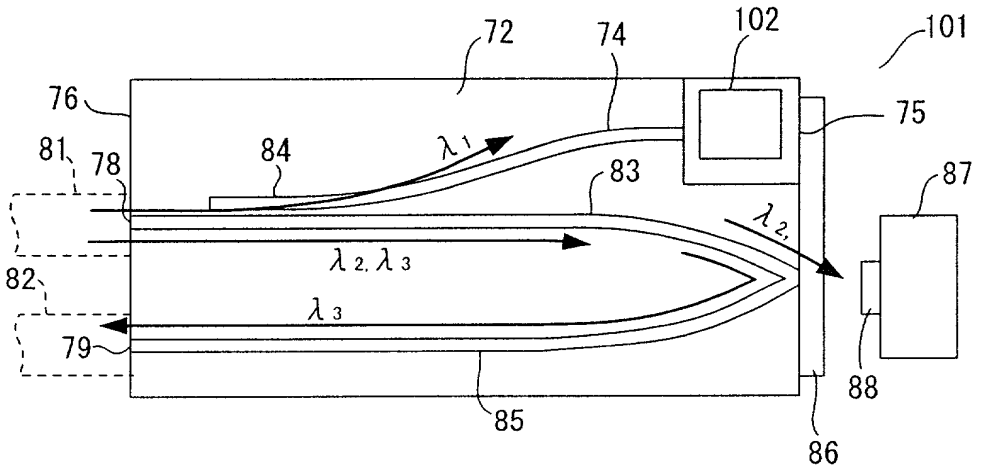
λ2, λ3 : WAVELENGTH
θ : ANGLE
83: 2ND OPTICAL WAVEGUIDE
85: 3RD OPTICAL WAVEGUIDE
86: WAVELENGTH FILTER
89: IDENTICAL POINT
90: LINE

FIG. 9



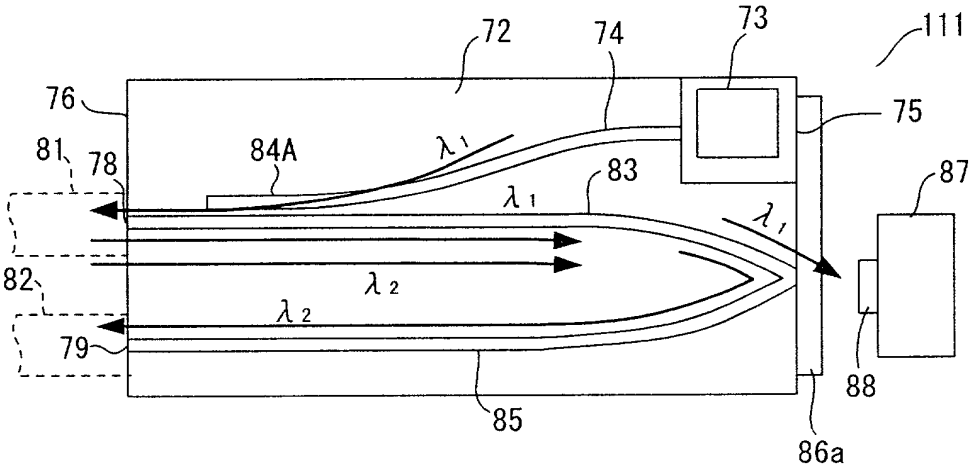
λ1, λ2, λ3: WAVELENGTH
72: OPTICAL WAVEGUIDE SUESTRATE
73: LIGHT EMITTING DEVICE
74: 1ST OPTICAL WAVEGUIDE
75, 76: END FACE
78: 1ST PORT
79: 2ND PORT
81: 1ST OPTICAL FIBER
82: 2ND OPTICAL FIBER
83: 2ND OPTICAL WAVEGUIDE
84: DIRECTIONAL COUPLER
85: 3RD OPTICAL WAVEGUIDE
86: WAVELENGTH FILTER
87: CARRIER
88: PHOTODETECTOR FOR RECEPTION
91: WAVELENGTH MULTIPLEXING OPTICAL COMMUNICATION MODULE

FIG. 10



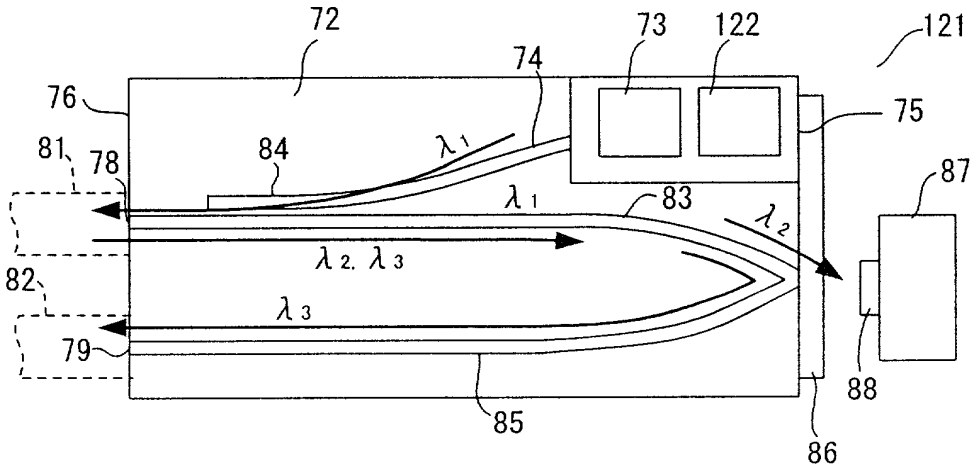
λ1, λ2, λ3: WAVELENGTH
72: OPTICAL WAVEGUIDE SUBSTRATE
74: 1ST OPTICAL WAVEGUIDE
75, 76: END FACE
78: 1ST PORT
79: 2ND PORT
81: 1ST OPTICAL FIBER
82: 2ND OPTICAL FIBER
83: 2ND OPTICAL WAVEGUIDE
84: DIRECTIONAL COUPLER
85: 3RD OPTICAL WAVEGUIDE
86: WAVELENGTH FILTER
87: CARRIER
88: PHOTODETECTOR FOR RECEPTION
101: WAVELENGTH MULTIPLEXING OPTICAL COMMUNICATION MODULE
102: PHOTODETECTOR

FIG. 11



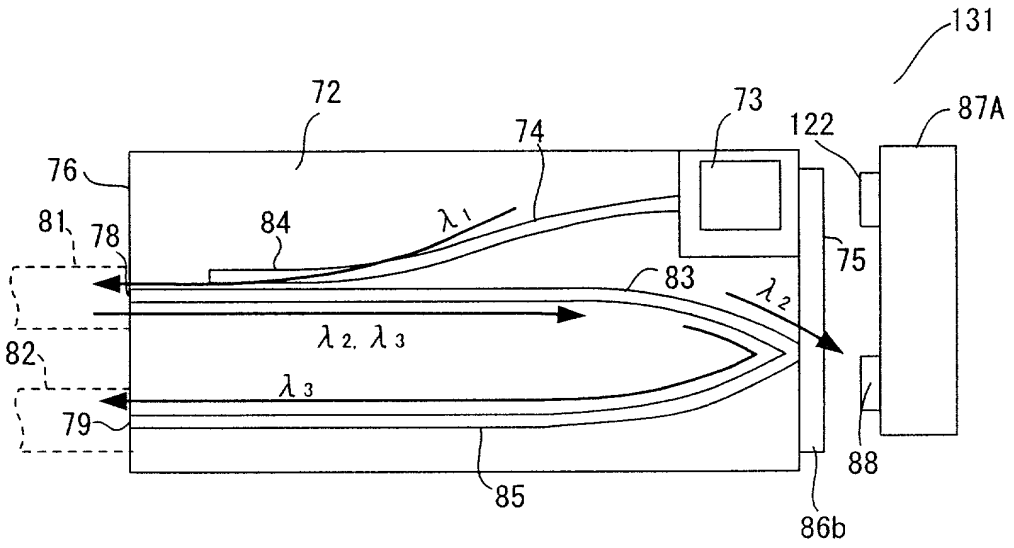
λ1, λ2: WAVELENGTH
72: OPTICAL WAVEGUIDE SUBSTRATE
73: LIGHT EMITTING DEVICE
74: 1ST OPTICAL WAVEGUIDE
75. 76: END FACE
78: 1ST PORT
79: 2ND PORT
81: 1ST OPTICAL FIBER
82: 2ND OPTICAL FIBER
83: 2ND OPTICAL WAVEGUIDE
84A: DIRECTIONAL COUPLER
85: 3RD OPTICAL WAVEGUIDE
86a: WAVELENGTH FILTER
87: CARRIER
88: PHOTODETECTOR FOR RECEPTION
111 : WAVELENGTH MULTIPLEXING OPTICAL COMMUNICATION MODULE

FIG. 12



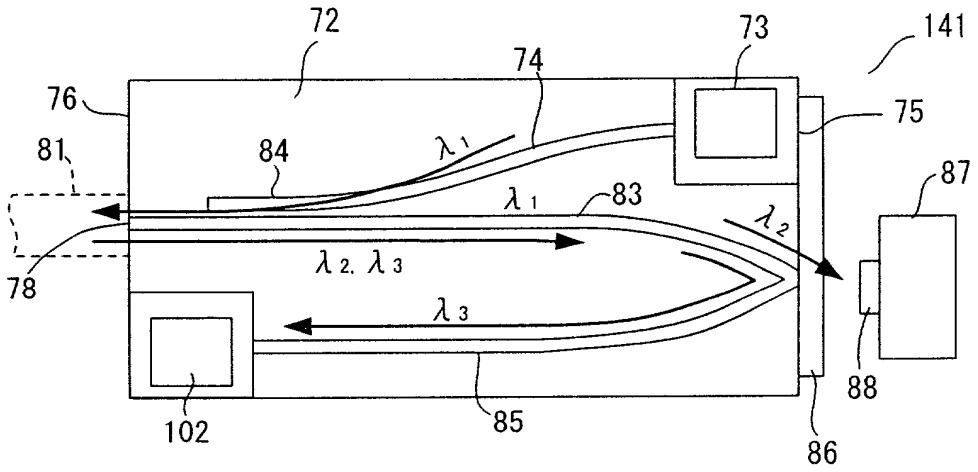
λ1, λ2, λ3: WAVELENGTH
72: OPTICAL WAVEGUIDE SUBSTRATE
73: LIGHT EMITTING DEVICE
74: 1ST OPTICAL WAVEGUIDE
75, 76: END FACE
78: 1ST PORT
79: 2ND PORT
81: 1ST OPTICAL FIBER
82: 2ND OPTICAL FIBER
83: 2ND OPTICAL WAVEGUIDE
84: DIRECTIONAL COUPLER
85: 3RD OPTICAL WAVEGUIDE
86: WAVELENGTH FILTER
87: CARRIER
88: PHOTODETECTOR FOR RECEPTION
121: WAVELENGTH MULTIPLEXING OPTICAL COMMUNICATION MODULE
122: PHOTODETECTOR FOR MONITORING

FIG. 13



λ1, λ2, λ3= WAVELENGTH
72: OPTICAL WAVEGUIDE SUBSTRATE
73: LIGHT EMITTING DEVICE
74: 1ST OPTICAL WAVEGUIDE
75. 76: END FACE
78: 1ST PORT
79: 2ND PORT
81: 1ST OPTICAL FIBER
B2: 2ND OPTICAL FIBER
B3: 2ND OPTICAL WAVEGUIDE
84: DIRECTIONAL COUPLER
85: 3RD OPTICAL WAVEGUIDE
86b: WAVELENGTH FILTER
87A: CARRIER
88: PHOTODETECTOR FOR RECEPTION
122: PHOTODETECTOR FOR MONITORING
131: WAVELENGTH MULTIPLEXING OPTICAL COMMUNICATION MODULE

FIG. 14



λ1, λ2, λ3: WAVELENGTH
72: OPTICAL WAVEGUIDE SUBSTRATE
73: LIGHT EMITTING DEVICE
74: 1ST OPTICAL WAVEGUIDE
75, 76: END FACE
78: 1ST PORT
81: 1ST OPTICAL FIBER
83: 2ND OPTICAL WAVEGUIDE
84: DIRECTIONAL COUPLER
85: 3RD OPTICAL WAVEGUIDE
86: WAVELENGTH FILTER
87: CARRIER
88: PHOTODETECTOR POR RECEPTION
102: PHOTODETECTOR
141: WAVELENGTH MULTIPLEXING OPTICAL COMMUNICATION MODULE